

If these be all reduced to the mean epoch 1870, the resulting mean place for January 1 of that year will be,—

R.A. $11^h 45^m 28^s.74$ N.P.D. $51^\circ 20' 55''.51$

from nine and ten observations in each element respectively. This may now be compared with the result obtained from the Greenwich 12-year Catalogue, and a proper motion be thus deduced from a large number of observations separated from each other by a very considerable interval of time. The mean place in question is, for the epoch 1845, January 1,—

R.A. $11^h 44^m 18^s.53$ N.P.D. $51^\circ 10' 10''.90$,

derived from thirteen and sixteen observations in each co-ordinate respectively.

The annual proper motion deducible from a comparison of these two results, the epochs of which are twenty-five years apart, is,—

In R.A. $+ 0^s.344$ In N.P.D. $+ 5''.77$.

This is equivalent to $7''.03$ in a great circle, which is well known to be the largest stellar proper motion hitherto recognised. So far as I am aware, those of five other stars only exceed the half of this quantity, viz., 61 *Cygni*, Lalande 21185, Lalande 21258, μ *Cassiopeiæ*, and δ^2 *Eridani*. The two latter of these have not I believe as yet been subjected to an investigation for parallax.

Note on the Colours of the Components of γ Delphini.

By Thos. G. E. Elger, Esq.

The remarkable discrepancies in the recorded colour-estimations of this well-known double-star, induced me in the autumn of 1866 to commence a series of observations, with a view to determine if they were due to actual changes in the colours of the components, or merely to what Smyth terms "personal chromatic equation." I am aware that, owing to the difficulty of referring star-colours to an absolute standard, observations of this nature must be to a certain extent unsatisfactory; yet, if a definite chromatic scale be used, and proper precautions taken, although we may not be able to speak with confidence as regards slight

variations in tone or intensity, we can do so respecting positive changes of tint.

In the subjoined observations I used a fine achromatic by Cooke, of 4 inches aperture, and an eye-piece magnifying 180 times.

The colours observed were referred to the diagram in Smyth's *Sidereal Chromatics*.

Between September 1866 and November 1872 I made thirty-three observations of the pair, and the results show, I think, that while the brighter star has remained constant in colour, the *comes* has, during that period, changed its tint from yellow to green, and from green to light-blue.

The colours of the pair are recorded in the *Cycle* (epoch 1839.7): A, yellow; B, light emerald. Sestini (epoch 1844.5) calls them, A, orange; B, yellow. Smyth, at Hartwell (epoch 1850.7), A, golden yellow; B, flushed grey; and Piazz Smyth, at the Alta Vista, Teneriffe (epoch 1856.67), tabulates them, A, cadmium yellow; B, greyish tinge.

The estimates of subsequent observers are equally discordant, at least so far as the colour of the *comes* is concerned.

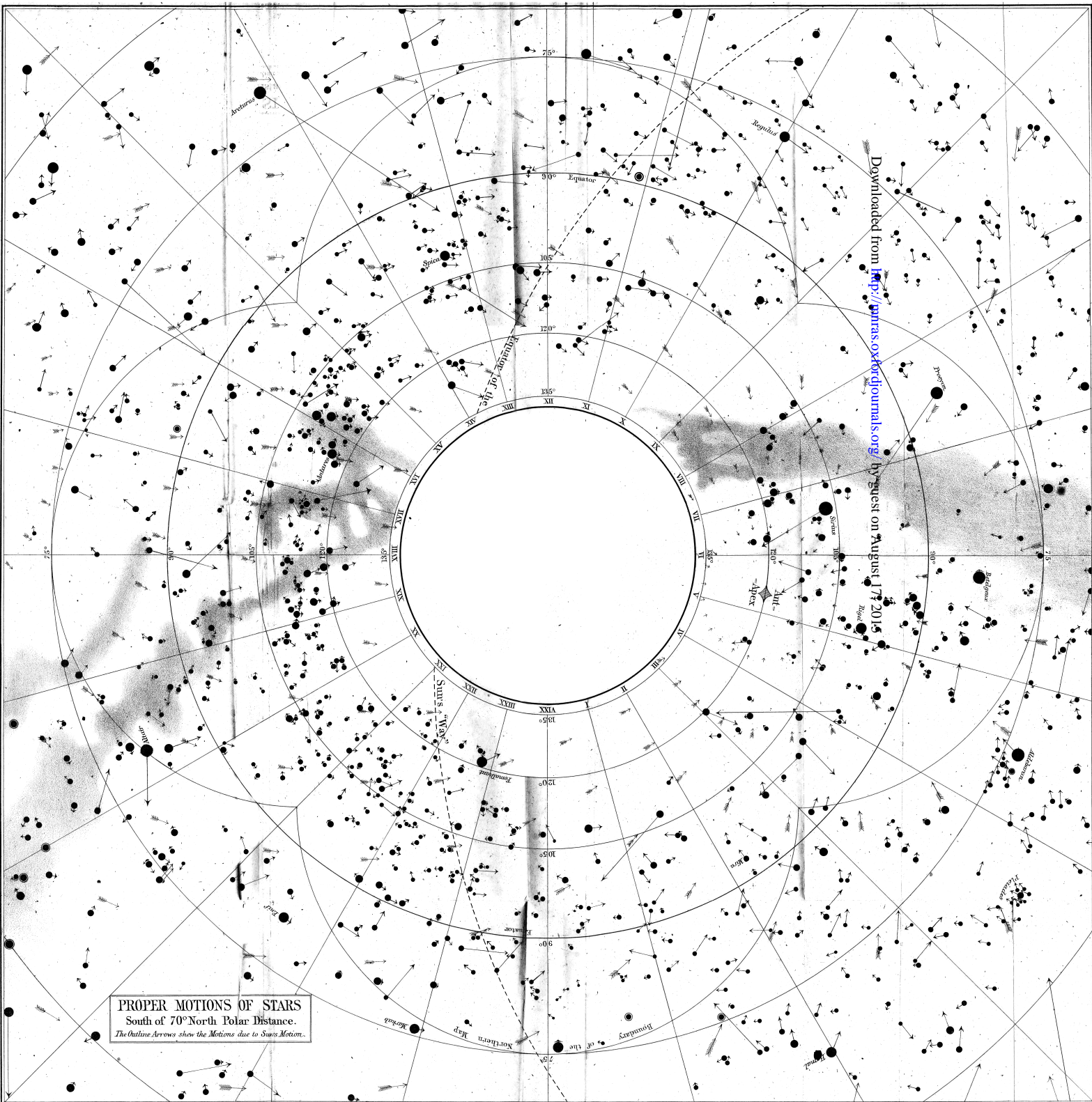
My observations stand as follows:—

Epoch 1866.71	A, orange ³	B, yellow. ³
1866.85	A, orange ⁴	B, orange. ⁴
1867.65	A, orange ³	B, yellow ⁴ , with a decided greenish hue
1867.82	A, orange ³	B, dull yellowish green.
1868.80	A, orange ³	B, yellow ⁴ , with a greenish hue.
1868.85	A, orange ⁴	B, dull green.
1869.64	A, orange ⁴	B, greyish blue.
1869.67	A, orange ⁴	B, greyish blue ⁴ (blue tint very decided).
1870.72	A, orange ⁴	B, dull grey.
1871.75	A, orange ³	B, greyish blue.
1872.74	A, orange ³	B, blue ⁴ (very delicate).
1872.88	A, orange ³	B, blue ⁴ .

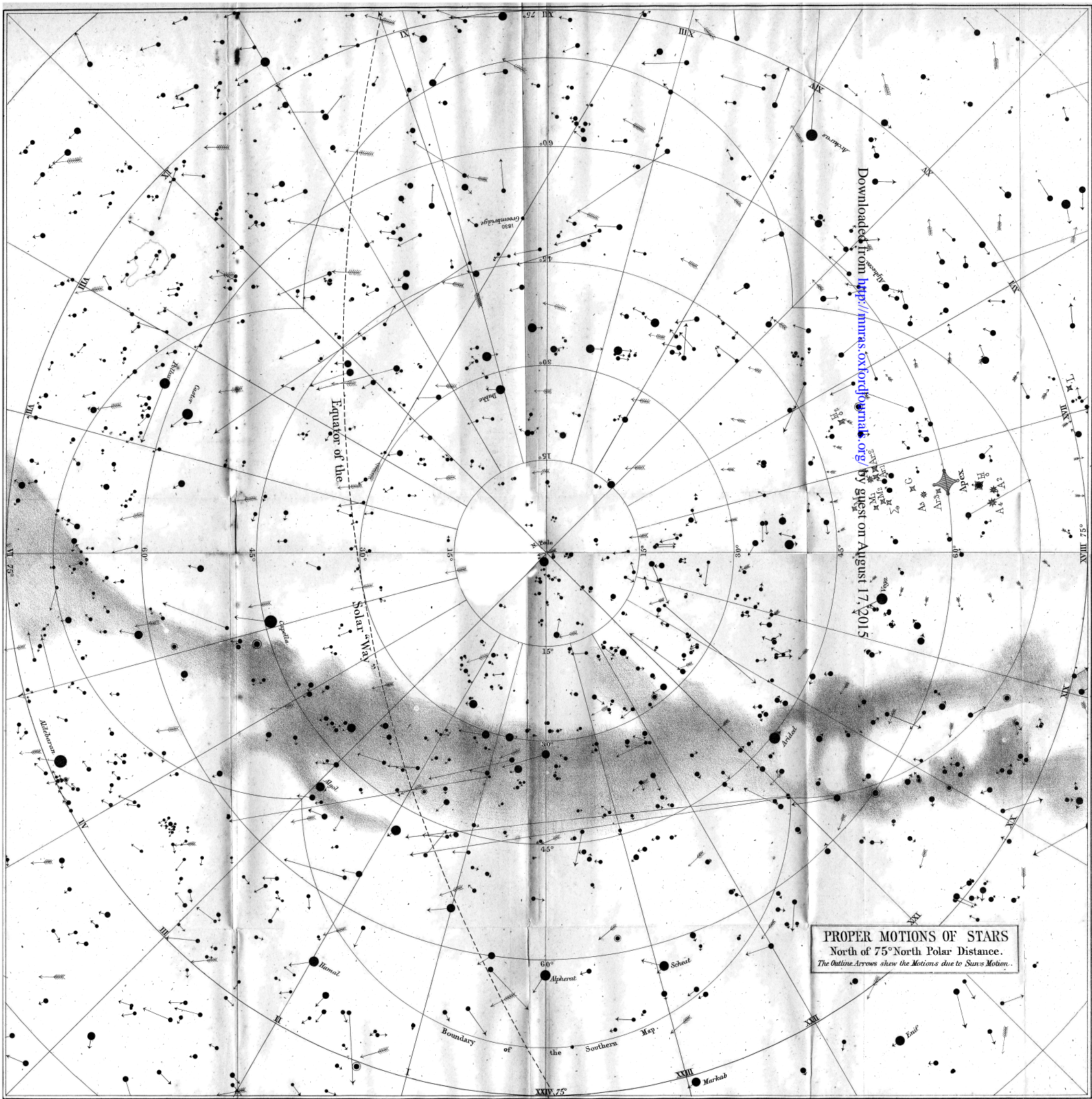
I may add that other pairs were observed on the same nights as γ Delphini (α , ϵ , and μ *Herculis*, for instance), my colour-estimations of which agree very fairly with those registered in the *Cycle* and elsewhere, showing that the changes of tint, just quoted, were not due to instrumental imperfections or personal peculiarities of vision.

It is noteworthy that the magnitudes of the components of γ Delphini, which, in the year 1839, were rated by Smyth at 4 and 7, are now very nearly equal: is it not probable that in this instance change of colour and magnitude are cognate phenomena?

Bedford, December 1872.



PROPER MOTIONS OF STARS
South of 70° North Polar Distance.
The Outline Arrows show the Motions due to Sun's Motion.



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PROPER MOTIONS OF STARS
 North of 75° North Polar Distance.
The Outline Arrows show the Motions due to Sun's Motion.